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ENVIRONMENTAL

Mitch Cron
Remedial Project Manager
U.S. Environmental Protection Agency, Region III
1650 Arch Street, 3HS22
Philadelphia, Pennsylvania 19103

Subject
Groundwater Monitoring Report, March 2003 Groundwater Sampling Event,
Bally Groundwater Contamination Site, Bally, Pennsylvania

Date
3 June 2003

Contact
Michael Bedard

Phone
215-752-6840

Email
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Our ref
NP000568.0002

Dear Mr. Cron:

On behalf of American Household, Inc. (AHI), ARCADIS presents this letter report summarizing the results of the March 2003 groundwater monitoring event at the Bally Groundwater Contamination Site (Site) in Bally, Pennsylvania. These groundwater samples were collected between March 25 and 28, 2003. The purpose of this event was to supplement the February 2003 groundwater monitoring event conducted by Civil & Environmental Consultants, Inc. (CEC) at the Site and to provide information on the current groundwater conditions at several wells that had not been monitored in several years. The methodologies used for the collection and laboratory analyses of samples, as well as the results of these analyses, are described below.

Wells Sampled

ARCADIS collected groundwater samples from 20 Site monitoring wells. The locations of these monitoring wells are presented on the attached Figures 1 and 2. In addition, samples were collected from the [redacted] and [redacted] residential wells. The [redacted] residential well is located at 34 Sycamore Road in Washington Township, approximately 1,400 feet hydraulically upgradient of the northern limits of the existing Site monitoring well network. The [redacted] residential well is located at 520 [redacted] Road in Washington Township, approximately 1,400 feet downgradient of the southeastern limits of the existing Site monitoring well network. The monitoring and residential wells are also listed on the attached Table 1.

The monitoring wells were selected based on their location relative to known areas of groundwater contamination, as well as their potential to provide information on the presence of 1,4-dioxane and other constituents at locations downgradient from known areas of impacted groundwater.

The residential wells were sampled due to these residents' requests to USEPA to have their wells sampled. USEPA forwarded those requests to AHI, and AHI agreed to sample these residential wells as part of this monitoring event.

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Sampling and Analysis Methods

The monitoring well samples were collected using low-flow sampling techniques. Specific vertical intervals were targeted within the wells wherever possible. These zones were selected based on water production information presented on the well construction logs. The well intervals that produced relatively high water flows during well construction were targeted for sample collection. Two samples were collected from separate vertical intervals within four of the Site monitoring wells (92-4D, 92-17, 97-23I and 87-9I). The sample names for these four wells include the depth of sample collection. For example, sample 92-4D-180 was collected at a depth of 180 feet below ground surface.

Severn Trent Laboratories, Inc. analyzed all samples at their Edison, New Jersey laboratory. Target Compound List (TCL) volatile and semi-volatile organic compounds (VOC's and SVOC's) were analyzed using USEPA Methods 624 and 625, respectively, with Level IV data reporting. The 1,4-dioxane analyses were performed using Method 625. This compound can be analyzed using either method, but Method 625 provided a lower detection limit and therefore was the method used for 1,4-dioxane analyses. The laboratory reports for all analyses are included in electronic files (Adobe® Acrobat® format) on the attached compact disk (Attachment 1).

The laboratory analytical data was validated according to the USEPA National Functional Guidelines for Organic Data Review (October 1999), as described in the attached validation memorandum (Attachment 2).

Analytical Results

As noted above, the results of all monitoring well and residential well sample analyses are presented on the attached Table 1. The monitoring well locations and analytical results for total VOC's and 1,4-dioxane are presented on the attached Figures 1 and 2, respectively.

As expected, the highest concentrations of total VOC's and 1,4-dioxane in groundwater were found near the former Bally Engineered Structures (BES) facility. The apparent limits of VOC-impacted groundwater during this sampling event appear to be consistent with historical groundwater conditions. VOC's were detected in 15 of the 20 monitoring wells sampled. No VOC's were detected in the [redacted] residential well. Although toluene was detected at 0.3 micrograms per liter (µg L) in the [redacted] residence well, it was just above the toluene detection limit of 0.2 µg L for this sample. Toluene is not a contaminant of concern with respect to the Bally site, and the Pennsylvania Department of Environmental Protection (PADEP) and USEPA Maximum Contaminant Level (MCL) for toluene in drinking water is 1,000 µg L.

Less historical data is available for 1,4-dioxane in Site groundwater than for total VOCs. This compound was not detected in monitoring well 97-23I or 97-23D for the March 2003 sampling event, while it was detected at an estimated concentration of 5.7 µg/L in well 97-23I during the February 2003 sampling event conducted by CEC. During the March 2003 sampling event, 1,4-dioxane was detected in five wells near the former BES facility at concentrations ranging from 0.8 to 14 µg/L.

We trust that this letter report provides you with an appropriate summary of the sampling event and the analytical results. If you have questions regarding this report, please contact us at (215) 752-6840.

Sincerely,

ARCADIS G&M, Inc.

Michael F. Bedard, P.E.
Project Manager

Frank Lenzo, P.E.
Project Director

Table
Figure 1
Figure 2
Attachment 1 Electronic Laboratory Analytical Reports
Attachment 2 Validation Memorandum

Copies:
Ron Gahagan
Toni Hemerka, Bally Borough
Ken Miller

Table 1. Summary of Groundwater Monitoring Results, March 2003, Bally Groundwater Contamination Site, Bally, Pennsylvania.

	Well Identification																											
Analyte	86-1	86-2	86-3D	86-3S	86-55D (Duplicate of 86-5D)	86-5D	87-4I	87-7I	87-10D	87-10I	87-11I	87-12D	92-44D (Duplicate of 92-4D-180)	92-4D-180	92-4D-277	92-17-163	92-17-275	92-18I	97-23D	97-23I-110	97-23I-140	[redacted]	87-11I	87-8I	87-9I-120	87-9I-170	92-15
Volatile Organic Compounds																												
Chloromethane	<0.4	<0.4	<0.4		<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4
[redacted]	[redacted]	[redacted]	4.3 J		[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3
Vinyl Chloride	<0.3	<0.3	<0.3		<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3
Chloroethane	<0.5	<0.5	<10.5 J		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Methylene Chloride	<0.9	<0.9	<0.9		<0.9	<0.9	<0.9	<0.9	<0.9	<0.9	<0.9	<0.9	<0.9	<0.9	<0.9	<0.9	<0.9	<0.9	<0.9	<0.9	<0.9	<0.9	<0.9	<0.9	<0.9	<0.9	<0.9	<0.9
Acetone	<0.7	<0.7	<0.7 J		<0.7	<0.7	<0.7	<0.7	<0.7	<0.7	<0.7	<0.7	<0.7	<0.7	<0.7	<0.7	<0.7	<0.7	<0.7	<0.7	<0.7	<0.7	<0.7	<0.7	<0.7	<0.7	<0.7	<0.7
Carbon Disulfide	<0.3	<0.3	0.5 J		<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.4 J	4	4.4	0.4	<0.3	<0.3	<0.3	10	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3
Trichlorofluoromethane	<0.4	<0.4	3.8		0.9	0.9	0.4	0.9	<0.4	<0.4	<0.4	1.6 J	<0.4	<0.4	<0.4	<0.4	<0.4	1.2	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4
1,1-Dichloroethane	<0.3	<0.3	2.3		6.3	6.7	2.7	6.4	3.7	1	<0.3	9	0.9	1.2	3.1	0.5	0.4	12	<0.3	0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	1.8
1,1-Dichloroethene	<0.3	<0.3	<0.3		<0.3	<0.3	<0.3	<0.3	0.6	<0.3	<0.3	0.4	0.8	1	0.5	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3
trans-1,2-Dichloroethene	<0.2	<0.2	<0.2		<0.2	<0.2	<0.2	<0.2	0.4	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
cis-1,2-Dichloroethene	<0.3	<0.3	3.1		<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	0.4	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3
Chloroform	<0.2	<0.2	0.4		<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	0.2	0.6	<0.2	<0.2	<0.2	<0.2	<0.2	0.7	<0.2	<0.2
1,2-Dichloroethane	<0.4	<0.4	<0.4		<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4
2-Butanone	<1.6	<1.6	<1.6 J		<1.6	<1.6	<1.6	<1.6	<1.6	<1.6	<1.6	<1.6	<1.6	<1.6	<1.6	<1.6	<1.6	<1.6	1.6	<1.6	<1.6	<1.6	<1.6	<1.6	<1.6	<1.6	<1.6	<1.6
1,1,1-Trichloroethane	<0.3	<0.3	0.8		7.3	7.2	1.1	6.2	1.2	0.4	<0.3	2.1	<0.3	<0.3	1.8	<0.3	<0.3	6.1	<0.3	0.5	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	3.4
Carbon Tetrachloride	<0.3	<0.3	<0.3		<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3
Bromodichloromethane	<0.2	<0.2	<0.2		<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
1,2-Dichloropropane	<0.4	<0.4	<0.4		<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4
cis-1,3-Dichloropropene	<0.3	<0.3	<0.3		<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3
[redacted]	[redacted]	[redacted]	[redacted]		5	4.9	[redacted]	4.7	12	4.7	[redacted]	79	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	0.2	0.5	0.4	<0.1	<0.1	<0.1	0.2	<0.1	4.3
[redacted]	<0.3	<0.3	[redacted]		[redacted]	[redacted]	[redacted]	[redacted]	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3
1,1,2-Trichloroethane	<0.3	<0.3	<0.3		<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3
Benzene	<0.3	<0.3	<0.3		<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3
trans-1,3-Dichloropropene	<0.3	<0.3	<0.3		<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3
Bromoform	<0.3	<0.3	<0.3		<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3
4-Methyl-2-Pentanone	<0.8	<0.8	0.8 J		<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8
2-Hexanone	<0.9	<0.9	0.9 J		<0.9	<0.9	<0.9	<0.9 J	<0.9	<0.9 J	<0.9	<0.9	<0.9	<0.9	<0.9	<0.9	<0.9	<0.9 J	<0.9	<0.9 J	<0.9 J	<0.9	<0.9	<0.9	<0.9	<0.9	<0.9	<0.9
Tetrachloroethene	<0.2	<0.2	2.4		<0.2	<0.2	0.4	<0.2	<0.2	<0.2	<0.2	1	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
1,1,2,2-Tetrachloroethane	<0.3	<0.3	<0.3		<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3
Toluene	<0.2	<0.2	0.9		<0.2	<0.2	0.3	<0.2	<0.2	0.3	<0.2	0.4	0.8	0.9	0.5	<0.2	<0.2	8.5	1.5	0.9	0.3	0.3	<0.2	<0.2	<0.2	<0.2	<0.2
Chlorobenzene	<0.2	<0.2	<0.2		<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Ethylbenzene	<0.2	<0.2	<0.2		<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Styrene	<0.2	<0.2	<0.2		<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Xylene (Total)	<0.2	<0.2	<0.2		<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Freon TF	<0.2	<0.2	0.2 J		<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
MTBE	<0.3	<0.3	<0.3		<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	0.4	0.3	<0.3	<0.3	<0.3	<0.3	0.7	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3
Cyclohexane	<0.4	<0.4	<0.4		<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4
1,2-Dibromoethane	<0.2	<0.2	<0.2		<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
1,3-Dichlorobenzene	<0.2	<0.2	<0.2		<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
1,4-Dichlorobenzene	<0.1	<0.1	<0.1		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
1,2-Dichlorobenzene	<0.3	<0.3	<0.3		<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3
Dichlorodifluoromethane	<0.3	<0.3	<0.3		<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3
Isopropylbenzene	<0.2	<0.2	<0.2		<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
1,2,4-Trichlorobenzene	<0.2	<0.2	<0.2		<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Methyl Acetate	<0.5	<0.5	<0.5		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Methyl cyclohexane	<0.3	<0.3	<0.3		<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3
1,2-Dibromo-3-chloropropane	<0.5	<0.5	0.5 J		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5

Notes:

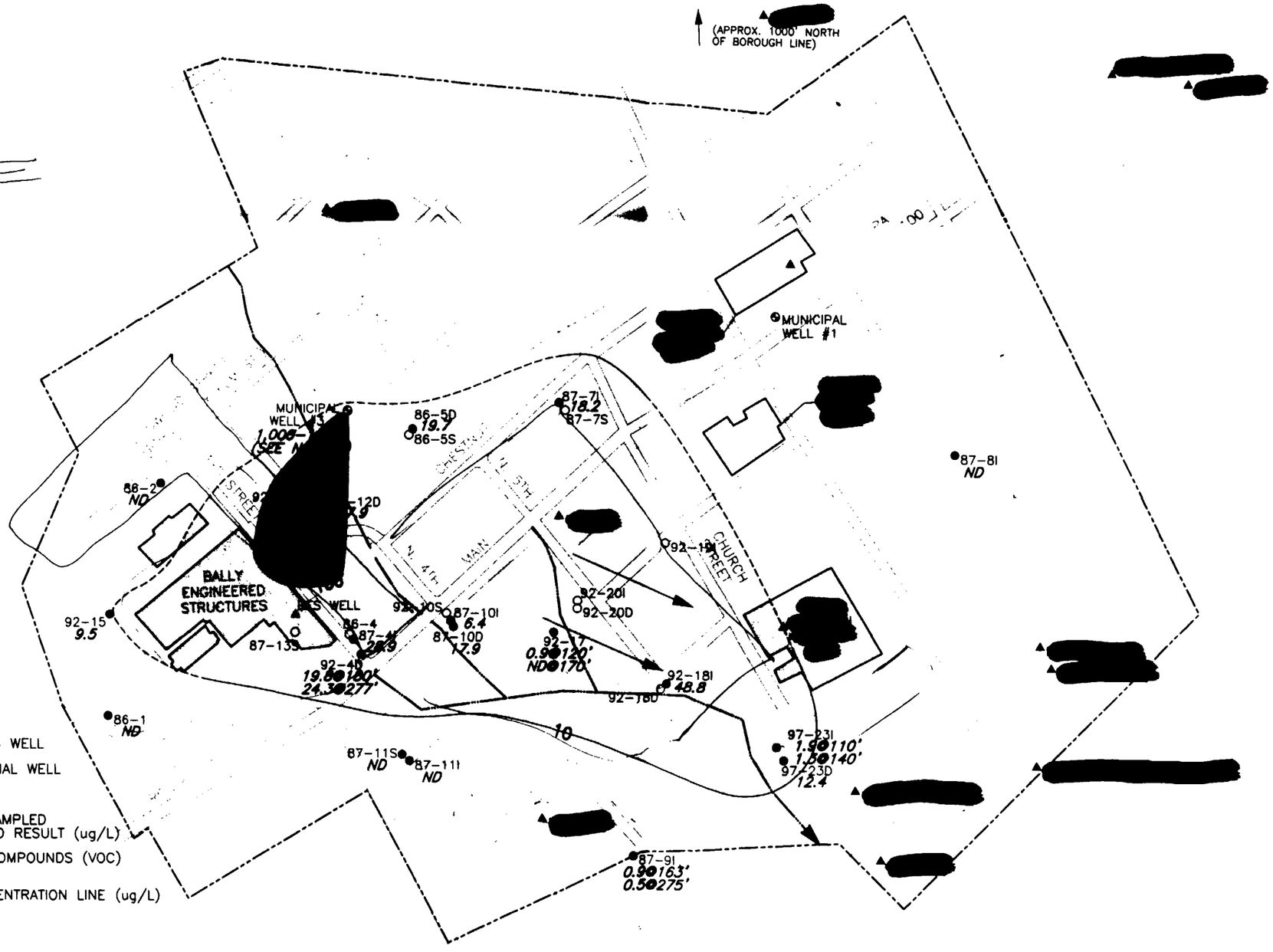
Detected values presented in bold

J- Results were qualified as estimated, presented in bold

Table 1. Summary of Groundwater Monitoring Results, March 2003, Bally Groundwater Contamination Site, Bally, Pennsylvania.

	Well Identification																									
Analyte	86-1	86-2	86-3D	86-3S	86-55D (Duplicate of 86-5D)	86-5D	87-4I	87-7I	87-10D	87-10I	87-11I	87-12D	92-44D (Duplicate of 92-4D-180)	92-4D-180	92-4D-277	92-17-163	92-17-275	92-18I	97-23D	97-23I-110	97-23I-140	[redacted]	87-11I	87-8I	87-9I-120	87-9I-170	92-15
Semi-Volatile Compounds																										
Phenol	<0.4	<0.4	<0.5	<0.5	<0.4	<0.4	<0.4	<0.5	<0.4	<0.4	<0.4	<0.4	1.4	1.5	<0.4	<0.4	<0.4	<0.5	<0.4	<0.5	0.5	<0.4	<0.4	<0.4	<0.4	<0.5	<0.5
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	<0.6	<0.6	<0.6	<0.6	<0.8	<0.6	<0.8	<0.8	<0.6	<0.6	<0.6	<0.6	<0.8	<0.8
2-Methylphenol	<1.2	<1.2	<0.8	<0.8	<1.2	<1.2	<1.2	<0.8	<1.2	<1.2	<1.2	<1.2	<1.2	<1.2	<1.2	<1.2	<1.2	<0.8	<1.2	<0.8	0.8	<1.2	<1.2	<1.2	<1.2	<0.8	<0.8
4-Methylphenol	<1.1	<1.1	<0.5	<0.5	<1.1	<1.1	1.1	<0.5	<1.1	<1.1	<1.1	<1.1	<1.1	<1.1	<1.1	<1.1	<1.1	<0.5	1.1	0.5	0.5	<1.1	1.1	<1.1	<1.1	0.5	<0.5
2-Nitrophenol	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	1	1	<1	<1	1	<1	<1	<1	<1
2,4-Dimethylphenol	<1.9	<1.9	<0.8	<0.8	<1.9	<1.9	<1.9	<0.8	<1.9	<1.9	<1.9	<1.9	<1.9	<1.9	<1.9	<1.9	<1.9	<0.8	1.9	0.8	0.8	<1.9	<1.9	1.9	<1.9	<0.8	<0.8
2,4-Dichlorophenol	<0.7	<0.7	<1.4	<1.4	<0.7	<0.7	<0.7	<1.4	<0.7	<0.7	<0.7	<0.7	<0.7	<0.7	<0.7	<0.7	<0.7	<1.4	0.7	<1.4	1.4	<0.7	<0.7	<0.7	<0.7	<1.4	<1.4
4-Chloro-3-methylphenol	<1.3	<1.3	<0.7	<0.7	<1.3	<1.3	<1.3	<0.7	<1.3	<1.3	<1.3	<1.3	<1.3	<1.3	<1.3	<1.3	<1.3	<0.7	<1.3	<0.7	0.7	<1.3	<1.3	<1.3	<1.3	<0.7	<0.7
2,4,6-Trichlorophenol	<0.4	<0.4	<0.9	<0.9	<0.4	<0.4	<0.4	<0.9	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.9	<0.4	<0.9	<0.9	<0.4	<0.4	<0.4	<0.4	<0.9	<0.9
2,4,5-Trichlorophenol	<0.9	<0.9	<1.3	<1.3	<0.9	<0.9	<0.9	<1.3	<0.9	<0.9	<0.9	<0.9	<0.9	<0.9	<0.9	<0.9	<0.9	<1.3	<0.9	<1.3	1.3	<0.9	0.9	<0.9	<0.9	<1.3	<1.3
2,4-Dinitrophenol	<0.9	<1	<0.9	<0.9	<0.9	<0.9	<0.9	<0.9	<0.9	<0.9	<1	<0.9	<0.9	<0.9	<0.9	<0.9	<1	<1	0.9	<1	<1	<0.9	0.9	<0.9	<0.9	<0.9	<1
4-Nitrophenol	<1	<1	<0.6	<0.6	<1	<1	<1	<0.6	<1	<1	<1	<1	<1	<1	<1	<1	<1	<0.6	<1	<0.6	<0.6	<1	<1	<1	<1	<0.6	<0.6
4,6-Dinitro-2-methylphenol	<1.6	<1.6	<1.4	<1.4	<1.7	<1.6	<1.6	<1.4	<1.6	<1.6	<1.6	<1.6	<1.6	<1.6	<1.6	<1.6	<1.6	<1.4	<1.6	<1.4	<1.4	<1.6	<1.6	<1.6	<1.6	<1.4	<1.4
Pentachlorophenol	<1	<1	<3.1	<3.1	<1	<1	<1	<3.1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<3.1	1	3.1	3.1	<1	<1	<1	<1	<3.1	<3.1
bis(2-Chloroethyl)ether	<0.3	<0.3	<0.7	<0.7	<0.3	<0.3	<0.3	<0.7	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.8	<0.3	<0.8	0.8	<0.3	<0.3	<0.3	<0.3	<0.7	<0.8
bis(2-chloroisopropyl)ether	<0.4	<0.4	<0.5	<0.5	<0.4	<0.4	<0.4	<0.5	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.5	0.5	<0.5	<0.5	<0.4	<0.4	0.4	<0.4	<0.5	<0.5
N-Nitroso-di-n-propylamine	<0.6	<0.6	<0.4	<0.4	<0.6	<0.6	<0.4	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.4	<0.6	<0.4	0.4	<0.6	<0.6	<0.6	<0.6	<0.4	<0.4
Hexachloroethane	<0.8	<0.8	<0.6	<0.6	<0.8	<0.8	<0.8	<0.6	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.6	0.8	<0.6	<0.6	<0.8	0.8	<0.8	<0.8	<0.6	<0.6
Nitrobenzene	<0.3	<0.4	<0.6	<0.6	<0.4	<0.4	<0.3	<0.6	<0.4	<0.4	<0.4	<0.3	<0.3	<0.3	<0.3	<0.3	<0.4	<0.6	<0.3	<0.6	<0.6	<0.3	<0.3	<0.3	<0.3	<0.6	<0.6
Isophorone	<0.3	<0.3	<0.4	<0.4	<0.3	<0.3	<0.3	<0.4	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.4	<0.3	<0.4	0.4	<0.3	<0.3	<0.3	<0.3	<0.4	<0.4
bis(2-Chloroethoxy)methane	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3
Naphthalene	<0.2	<0.2	<0.04	<0.04	<0.2	<0.2	<0.2	<0.04	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.04	<0.2	0.041	0.04	<0.2	<0.2	<0.2	<0.2	<0.04	<0.04
4-Chloroaniline	<0.6	<0.6	<0.7	<0.7	<0.6	<0.6	<0.6	<0.7	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.7	<0.6	<0.7	<0.7	<0.6	0.6	<0.6	<0.6	<0.7	<0.7
Hexachlorobutadiene	<1.3	<1.3	<0.4	<0.4	<1.3	<1.3	<1.3	<0.4	<1.3	<1.3	<1.3	<1.3	<1.3	<1.3	<1.3	<1.3	<1.3	<0.4	<1.3	<0.4	<0.4	<1.3	<1.3	<1.3	<1.3	<0.4	<0.4
2-Methylnaphthalene	<0.3	<0.3	<0.5	<0.5	<0.3	<0.3	<0.3	<0.5	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.5	<0.3	0.5	<0.5	<0.3	<0.3	<0.3	<0.3	<0.5	<0.5
Hexachlorocyclopentadiene	<0.8	<0.8	<0.9	<0.9	<0.8	<0.8	<0.8	<0.9	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.9	<0.8	<0.9	<0.9	<0.8	<0.8	<0.8	<0.8	<0.9	<0.9
2-Chloronaphthalene	<0.4	<0.4	<0.5	<0.5	<0.4	<0.4	<0.4	<0.5	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.5	<0.4	<0.5	<0.5	<0.4	<0.4	<0.4	<0.4	<0.5	<0.5
2-Nitroaniline	<0.2	<0.2	<0.5	<0.5	<0.2	<0.2	<0.2	<0.5	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.5	<0.2	<0.5	<0.5	<0.2	<0.2	<0.2	<0.2	<0.4	<0.4
Dimethylphthalate	<0.2	<0.2	<0.07	<0.07	<0.2	0.2	0.2	0.07	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.07	<0.2	<0.071	<0.07	<0.2	<0.2	<0.2	<0.2	<0.07	<0.071
Acenaphthylene	<0.4	<0.4	<0.6	<0.6	0.4	0.4	0.4	0.6	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.6	<0.4	<0.6	0.6	<0.4	<0.4	<0.4	<0.4	<0.6	<0.6
2,6-Dinitrotoluene	<0.4	<0.4	<0.6	<0.6	0.4	0.4	0.4	0.6	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.6	<0.4	<0.6	<0.6	<0.4	<0.4	<0.4	<0.4	<0.6	<0.6
3-Nitroaniline	<0.4	<0.4	<0.1	<0.1	0.4	0.4	0.4	<0.1	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.1	0.4	<0.1	<0.1	<0.4	<0.4	<0.4	<0.4	<0.1	<0.1
Dibenzofuran	<0.2	<0.2	<0.3	<0.3	<0.2	<0.2	<0.2	<0.3	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.3	<0.2	0.3	0.3	<0.2	<0.2	<0.2	<0.2	<0.3	<0.3
2,4-Dinitrotoluene	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4
Diethylphthalate	<0.3	<0.3	<0.2	<0.2	<0.1	<0.1	<0.1	<0.2	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.2	<0.3	<0.2	<0.2	<0.1	<0.3	<0.3	<0.3	<0.2	<0.2
4-Chlorophenyl-phenylether	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Fluorene	<0.2	<0.2	<0.1	<0.1	<0.2	0.2	<0.2	<0.1	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.1	<0.2	<0.1	<0.1	<0.2	<0.2	<0.2	<0.2	<0.1	<0.1
4-Nitroaniline	<0.8	<0.8	<0.4	<0.4	<0.8	<0.8	<0.8	<0.4	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.4	<0.8	<0.4	<0.4	<0.8	<0.8	<0.8	<0.8	<0.4	<0.4
N-Nitrosodiphenylamine	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
4-Bromophenyl-phenylether	<0.4	<0.4	<0.2	<0.2	0.4	<0.4	<0.4	<0.2	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.2	<0.4	<0.2	0.2	<0.4	<0.4	<0.4	<0.4	<0.2	<0.2
Hexachlorobenzene	<0.5	<0.5	<0.8	<0.8	0.5	<0.5	<0.5	<0.8	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.8	<0.5	<0.8	<0.8	<0.5	<0.5	<0.5	<0.5	<0.8	<0.8
Phenanthrene	<0.2	<0.2	<0.1	0.1	0.2	<0.2	<0.2	<0.1	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.1	<0.2	<0.1	0.1	<0.2	<0.2	0.2	<0.2	<0.1	<0.1
Anthracene	<0.3	<0.3	<0.08	0.08	<0.3	<0.3	<0.3	<0.08	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.08	<0.3	<0.082	<0.08	<0.3	<0.3	<0.3	<0.3	<0.08	<0.081
Carbazole	<0.4	<0.4	<0.08	<0.08	<0.4	<0.4	<0.4	<0.08	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.08	<0.4	<0.082	0.08	<0.4	<0.4	0.4	<0.4	<0.08	<0.081
Di-n-butylphthalate	<0.3	<0.3	<0.4	<0.4	<0.3	<0.3	<0.3	<0.4	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.4	<0.3	<0.4	0.4	<0.3	<0.3	<0.3	<0.3	<0.4	<0.4
Fluoranthene	<0.3	<0.3	0.05	0.05	0.3	<0.3	<0.3	<0.05	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.05	<0.3	<0.051	0.05	<0.3	<0.3	<0.3	<0.3	<0.05	<0.05
Pyrene	<0.2	<0.2	<0.07	<0.07	<0.2	<0.2	<0.2	<0.07	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.07	<0.2	<0.071	<0.07	<0.2	<0.2	<0.2	<0.2	<0.07	<0.071
Butylbenzylphthalate	<0.1	<0.1	<0.4	0.4	<0.1	<0.1	<0.1	<0.4	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.4	<0.1	<0.4	<0.4	<0.1	<0.1	<0.1	<0.1	<0.4	<0.4
3,3'-Dichlorobenzidine	<1.3	<1.3	<2.2	2.2	1.3	<1.3	<1.3	<2.2	<1.3	<1.3	<1.3	<1.3	<1.3	<1.3	<1.3	<1.3	<1.3	<2.2	<1.3	<2.2	2.2	<1.3	<1.3	<1.3	<1.3	<2.2	<2.2
Benzo(a)anthracene	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	0.2	<0.2	0.2	<0.2	<0.2	<0.2	<0.2
Chrysene	<0.2	<0.2	<0.07	<0.07	<0.2	<0.2	<0.2	<0.07	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.07	<0.2	<0.071	<0.07	<0.2	<0.2	<0.2	<0.2	<0.07	<0.071
bis(2-Ethylhexyl)phthalate	<0.2	<0.2	<0.6	<0.6	<0.2	<0.2	<0.2	<0.6	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.6	<0.2	<0.6	<0.6	<0.2	<0.2	<0.2	<0.2	<0.6	0.8
Di-n-octylphthalate	<0.3	<0.3	<0.2	<0.2	<0.3	<0.3	<0.3	<0.2	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.2	<0.3	<0.2	<0.2	0.3	<0.3	<0.3	<0.3	<0.2	<0.2
Benzo(b)fluoranthene	<0.4	<0.4	<0.1	<0.1	<0.4	<0.4	<0.4	<0.1	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.1	<0.4	<0.1	0.1	<0.4	<0.4	<0.4	<0.4	<0.1	<0.1
Benzo(k)fluoranthene	<0.092	<0.093	1.6	<1.6	<0.092	<0.092	<0.09	<1.6	<0.092	<0.09	<0.091	<0.091	<0.09	<0.09	<0.090	<0.09	<0.09	<1.6	<0.091	<1.6	<1.6	<0.09	<0.091	<0.09	<0.091	<0.090	<1.6
Benzo(a)pyrene	<0.4	<0.4	<0.08	<0.08	<0.4	<0.4	<0.4	<0.08	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.08	<0.4	<0.082	<0.08	<0.4	<0.4	<0.4	<0.4	<0.08	<0.081
Indeno(1,2,3-cd)pyrene	<0.8	<0.8	<0.08	<0.08	<0.8	<0.8	<0.8	<0.08	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.08	<0.8	<0.082	<0.08	<0.8	<0.8	<0.8	<0.8	<0.08	<0.081
Dibenz(a,h)anthracene	<0.6	<0.6	<0.04	<0.04	<0.6	<0.6	<0.6	<0.04	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.04	<0.6	<0.041	<0.04	<0.6	<0.6	<0.6	<0.6	<0.04	<0.04
Benzo(g,h,i)perylene	<1	<1	<0.06	<0.06	<1	<1	<1	<0.06	<1	<1	<1	<1	<1	<1	<1	<1	<1	<0.06	<1	<0.061	<0.06	<1	<1	<1	<1	<0.06	<0.061
Diphenyl	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4
Acetophenone	<0.7	<0.7	<0.6	<0.6	<0.7	<0.7	<0.7	<0.6	<0.7	<0.7	<0.7	<0.7	<0.7	<0.7	<0.7	<0.7	<0.7	<0.6	<0.7	<0.6	<0.6	<0.7	<0.7	<0.7	<0.7	<0.6	<0.6
1,4-Dioxane	<0.4	<0.4	9.1	14	<0.5	<0.5	7.4	<0.6	<0.5	<0.4	<0.4	1.8	0.8 J	<0.4 J	<0.4	<0.4	<0.4	<0.7	<0.4	<0.7	<0.7	<0.4	<0.4	<0.4	<0.4 J	<0.4 J	<0.6	<0.7
Benzaldehyde	<0.8	<0.8	<0.9	<0.9	<0.8	<0.8	<0.7	<0.9	<0.8	<0.7	<1) 7 J	<0.8	<0.7	<0.7	<0.7	<0.7	<0.7	<0.9	<0.7	<0.9	<0.9	<0.7	<0.8	<0.7	<0.8	<0.7	<0.9	<0.9
Atrazine	<0.3	<0.3	<0.5	<0.5	<0.3	<0.3	<0.3	<0.5	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.5	<0.3	<0.5	<0.5	<0.3	<0.3	<0.3	<0.3	0.5	<0.5

Notes:
Detected values presented in bold
J- Results were qualified as estimated, presented in bold



LEGEND

- STREAM
- EXISTING MONITORING WELL
- PRIVATE OR INDUSTRIAL WELL
- MUNICIPAL WELL
- MONITORING WELL SAMPLED IN MARCH 2003, AND RESULT (ug/L)
- *ND* VOLATILE ORGANIC COMPOUNDS (VOC) NOT DETECTED
- —10— TOTAL VOC ISOCONCENTRATION LINE (ug/L) AND RESULT (ug/L)
- 10 – 99 ug/L
- 100 – 1000 ug/L
- GROUNDWATER FLOW DIRECTION (DEEP ZONE)

NOTES:

1. ALL CONCENTRATIONS IN ug/L
2. RANGE OF TOTAL VOC VALUES AT WELL No.3 BASED ON MONTHLY TESTING BY CEC, INC.
3. MONITORING WELLS 92-16 AND 92-16P WERE NOT LOCATED AND APPARENTLY NO LONGER EXIST.

AR300101

J:\APROJECT\AH Bally, PA\CADD\March 2003 GW Maps\FIG-1 MARCH 2003 GW VOC.dwg Jun 03, 2003
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0 500
SCALE: 1"=500'

NO.	DATE	REVISION DESCRIPTION	BY	CKD

ARCADIS
3000 Cabot Blvd West
Suite 3004, Langhorne, Pa 19047
Tel: 215/752-6840 Fax: 215/752-6879

DRAWN	DATE	PROJECT MANAGER	DEPARTMENT MANAGER
M. WASILEWSKI	6/2/03	M. BEDARD	D. FULTON
		LEAD DESIGN PROF. F. LENZO	CHECKED CTS
ARCADIS MARCH 2003 MONITORING WELL SAMPLES TOTAL VOC CONCENTRATIONS		PROJECT NUMBER NP000568.002	DRAWING NUMBER 1

(APPROX. 1000' NORTH OF BOROUGH LINE)

MUNICIPAL WELL #1

MUNICIPAL WELL #3

30-45 (SEE NO

86-5D ND
86-5S

87-7I ND
87-7S

87-8I ND

88-2 ND

12D

BALLY ENGINEERED STRUCTURES

WELL 86-4

87-4I 7.4

87-13S

92-4D 0.8

92-15 ND

92-10S

87-10I ND
87-10D ND

92-19I

92-20I
92-20D

92-17 ND@120' ND@170'

92-18I

92-18D ND

86-1 ND

87-11S ND
87-11I ND

97-23I ND@110' ND@140'
97-23D

87-9I ND@163' ND@275'

LEGEND

- STREAM
- EXISTING MONITORING WELL
- PRIVATE OR INDUSTRIAL WELL
- MUNICIPAL WELL
- MONITORING WELL SAMPLED IN MARCH 2003, AND RESULT (ug/L)
- ND 1,4-DIOXANE NOT DETECTED
- 5 1,4-DIOXANE ISOCONCENTRATION LINE (ug/L)
- 5 – 9 ug/L
- > 10 ug/L
- GROUNDWATER FLOW DIRECTION (DEEP ZONE)

NOTES:

1. ALL CONCENTRATIONS IN ug/L
2. RANGE OF 1,4-DIOXANE VALUES AT WELL No.3 BASED ON WEEKLY TESTING BY CEC, INC.
3. DETECTION LIMIT 0.4 µG/L FOR 1,4-DIOXANE ANALYSES IN MONITORING WELLS.
4. MONITORING WELLS 92-16 AND 92-16P WERE NOT LOCATED AND APPARENTLY NO LONGER EXIST.

AR300102

G:\APROJECT\AH Bally, PA\CADD\March 2003 GW Maps\FIG-2 MARCH 2003 DIOXANE.dwg Jun 03, 2003

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SCALE: 1"=500'

NO.	DATE	REVISION DESCRIPTION	BY CKD

ARCADIS
3000 Cabot Blvd West
Suite 3004, Langhorne, Pa 19047
Tel: 215/752-6840 Fax: 215/752-6879

DRAWN	DATE	PROJECT MANAGER	DEPARTMENT MANAGER
M. WASILEWSKI	6/2/03	M. BEDARD	D. FULTON
		LEAD DESIGN PROF. F. LENZO	CHECKED CTS
		PROJECT NUMBER	DRAWING NUMBER

ARCADIS MARCH 2003
MONITORING WELL SAMPLES
1,4-DIOXANE

NP000568.002

2

ARCADIS

Attachment 1

Electronic Laboratory Analytical Reports

SDMS US EPA Region III

Imagery Insert Form

Site Name: Bally Groundwater Document ID: 2050639

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DATA CD 3D 300103

☐ Document is available at the EPA Region 3 Superfund Records Center.

Specify Type of Document(s) / Comments:

ARCADIS

Attachment 2

Validation Memorandum

MEMO

ARCADIS G&M, Inc.
88 Duryea Road
Melville
New York 11747
Tel 631 249-7600
Fax 631 249-7610

To:
Mike Bedard
ARCADIS Langhorne

Copies:

From:
Donna M. Brown

Date:
2 May 2003

ENVIRONMENTAL

Subject:
Organic and Inorganic Data Validation of the Aqueous Samples Collected from the Bally, PA Site During March 2003.

DATA VALIDATION

Aqueous samples, three replicates, five trip blanks, and three field blanks were collected at the Bally, PA Site in March 2003. The samples were sent to Severn Trent Laboratory (STL), located in Edison, New Jersey for analysis. The samples for one or more of the following: target compound list (TCL) volatile organic compounds (VOCs) by United States Environmental Protection Agency (USEPA) method 624, TCL semivolatile organic compounds (SVOCs) and 1,4-Dioxane by USEPA method 625, TAL metals, and classical chemistry parameters. Bromide and fluoride were analyzed by STL located in Pittsburgh, PA. Validation of the organic data was performed following the USEPA National Functional Guidelines for Organic Data Review, October 1999. Validation of the inorganic data was performed following USEPA National Functional Guidelines for Inorganic Data Review, July 2002.

ARCADIS received a sample data packages for VOCs and/or SVOCs with job numbers: G301, H123, H125, H177, H242, H243, H245, and H272. The bromide and fluoride samples were provided in job number C3C070207 and the remaining classical chemistry parameter and TAL metals were in job number G304.

The quality of the data was acceptable with the qualifiers discussed below. The data validation results are discussed by fraction and job number below.

ORGANIC COMPOUNDS

Job Number G301

Three samples (TAP for VOCs, WELL#3 and WELL#2 for VOCs and SVOCs+1,4-dioxane), two replicates (WELL#3DUP and WELL#2DUP for VOCs and SVOCs+1,4-dioxane), and one field blank were collected on March 6, 2003 and the data was provided in a level 2 package. No raw data was provided for the calibration and matrix spike data in G301.

I. Holding Times

Volatiles: Samples were analyzed within holding time requirements.

Semi-volatiles: Samples were extracted and analyzed within holding time requirements.

II. Gas Chromatograph/Mass Spectrometer Instrument Performance Check

Volatiles: All tuning criteria were met.

Semi-volatiles: All tuning criteria were met.

III. Initial Calibration

Volatiles: One initial calibration was performed with this sample set. The percent relative standard deviations (%RSDs) were found to be <30%. The relative response factors (RRFs) were greater than 0.050 except for the following:

Calibration Date: 2/14/03

Compound	RRF
2-Butanone	0.045

Associated samples: All samples.

The associated sample compound results were qualified as estimated (J), if detected and unusable (R) if not detected.

Semi-volatiles: One initial calibration was performed with this sample set. All RRF's for target compounds and system monitoring compounds were greater than 0.05. The %RSDs were found to be <30%, except for the following:

Calibration Date: 3/3/03

Compound	%RSD
Benzaldehyde	53.9

Associated samples: All samples.

The associated compound results were qualified as estimated (J) if detected.

IV. Continuing Calibration

Volatiles: One continuing calibration was analyzed with this sample set. The compounds had RRFs greater than 0.050 and percent difference (%D) values were <25%, except for the following:

AR300106

Calibration Date: 3/7/03

Compound	% D	RRF
2-Butanone	--	0.045
Carbon Disulfide	29.1	--

Associated samples: All samples.

Carbon disulfide results were qualified as estimated (J), if detected and estimated (UJ), if not detected and 2-butanone results were qualified as estimated (J), if detected and unusable (R) if not detected.

Semi-volatiles: One continuing calibration was run with this sample set on March 7, 2003. The continuing calibration had RRF's greater than 0.050 and %D were <25%.

V. Blanks

Volatiles: Three method blanks, a trip blank, and a field blank were analyzed with this sample set. Target compounds were not detected in any of the blanks.

Semi-volatiles: One method blank was analyzed with this sample set. Bis(2-ethylhexyl)phthalate was detected in the method blank. No qualification of the data was necessary.

VI. System Monitoring Compounds (Surrogate Spikes)

Volatiles: All surrogate spike recoveries were within QC limits.

Semi-volatiles: All surrogate spike recoveries were within QC limits.

VII. Matrix Spike/Blank Spike (MS/BS)

Volatiles: The %R values were within QC limits for the MS/BS except for ethylbenzene in one of the two MS analyzed. Qualification of the data based on the MS/BS results was not necessary.

Semi-volatiles: The %R values were within QC limits for the MS/BS.

VIII. Regional QA/QC (Field Duplicates)

Volatiles: Sample WELL#3 and WELL#2 were replicated and labeled WELL#3DUP and WELL#2DUP, respectively. 1,1-Dichloroethene in WELL#2 and WELL#2DUP were qualified as estimated (J) based on replicate results.

Semi-volatiles: Sample WELL#3 and WELL#2 were replicated and labeled WELL#3DUP and WELL#2DUP, respectively. The replicate results were acceptable.

IX. Internal Standards Performance

Volatiles: All internal standard area counts and retention times met QC requirements.

Semi-volatiles: All internal standard area counts and retention times met QC requirements.

X. Compound Identification and Reported Detection Limits

Volatiles: The reporting limits were acceptable and the compounds were reported correctly.

Semi-volatiles: The reporting limits were acceptable and the compounds were reported correctly.

XI. Overall Assessment of Data for the Case

Volatiles: The QC presented in the data validation package is acceptable, with the qualifications specified above.

Semi-volatiles: The QC presented in the data validation package is acceptable, with the qualifications specified above.

Job Number H123

Five samples (92-15, 87-9I-120, 87-9I-170, 87-11I, 87-8I for VOC analysis and 87-9I-120 for SVOC+1.4-dioxane) and one trip blank were collected on March 24 and 25, 2003 and the data was provided in a level 2 package. No raw data was provided for the calibration and matrix spike data in H123.

I. Holding Times

Volatiles: Samples were analyzed within holding time requirements.

Semi-volatiles: Samples were extracted and analyzed within holding time requirements.

II. Gas Chromatograph/Mass Spectrometer Instrument Performance Check

Volatiles: All tuning criteria were met.

Semi-volatiles: All tuning criteria were met.

III. Initial Calibration

Volatiles: One initial calibration was performed with this sample set on March 17, 2003. The %RSDs were found to be <30% and RRFs were greater than 0.050.

Semi-volatiles: One initial calibration was performed with this sample set. All RRF's for target compounds and system monitoring compounds were greater than 0.05. The %RSDs were found to be <30%, except for the following:

Calibration Date: 3/11/03

Compound	%RSD
Benzaldehyde	58

Associated samples: All samples.

The associated compound results were qualified as estimated (J) if detected.

IV. Continuing Calibration

Volatiles: One continuing calibration was analyzed with this sample set on March 28, 2003. The compounds had RRFs greater than 0.050 and percent difference (%D) values were <25%.

Semi-volatiles: One continuing calibration was run with this sample set on March 28, 2003. The continuing calibration had RRF's greater than 0.050 and %D were < 25% except for the following:

Calibration Date: 3/28/03

Compound	% D
1,4-Dioxane	27.9

Associated samples: All samples.

1,4-Dioxane results were qualified as estimated (J), if detected and estimated (UJ), if not detected.

V. Blanks

Volatiles: A method blank and a trip blank were analyzed with this sample set. Target compounds were not detected in any of the blanks.

Semi-volatiles: One method blank was analyzed with this sample set. Target compounds were not detected in the blank.

VI. System Monitoring Compounds (Surrogate Spikes)

Volatiles: All surrogate spike recoveries were within QC limits.

Semi-volatiles: All surrogate spike recoveries were within QC limits.

AR300109

VII. Matrix Spike/Blank Spike (MS/BS)

Volatiles: The %R values were within QC limits for the MS/BS.

Semi-volatiles: The %R values were within QC limits for the MS/BS.

VIII. Regional QA/QC (Field Duplicates)

Volatiles: Not applicable.

Semi-volatiles: Not applicable.

IX. Internal Standards Performance

Volatiles: All internal standard area counts and retention times met QC requirements.

Semi-volatiles: All internal standard area counts and retention times met QC requirements.

X. *Reported Detection Limits and Compound Identification*

Volatiles: The reporting limits were acceptable and the compounds were reported correctly.

Semi-volatiles: The reporting limits were acceptable and no compounds were detected.

XI. Overall Assessment of Data for the Case

Volatiles: The QC presented in the data validation package is acceptable.

Semi-volatiles: The QC presented in the data validation package is acceptable, with the qualifications specified above

Job Number H125

Five samples (87-7I, 97-23I-110, 97-23I-140, 92-18I for VOC and SVOC+1,4-dioxane analysis and 87-10I for VOC) and one field blank were collected on March 26, 2003 and the data was provided in a level 2 package. No raw data was provided for the calibration and matrix spike data in H125.

I. Holding Times

Volatiles: Samples were analyzed within holding time requirements.

Semi-volatiles: Samples were extracted and analyzed within holding time requirements.

II. Gas Chromatograph/Mass Spectrometer Instrument Performance Check

Volatiles: All tuning criteria were met.

Semi-volatiles: All tuning criteria were met.

III. Initial Calibration

Volatiles: One initial calibration was performed with this sample set. The %RSDs were found to be <30% and RRFs were greater than 0.050 except for the following:

Calibration Date: 2/24/03

Compound	%RSD
Acetone	36

Associated samples: All samples.

The associated compound results were qualified as estimated (J) if detected.

Semi-volatiles: Three initial calibrations were performed with this sample set on March 30, 31 and April 2, 2003. All RRF's for target compounds and system monitoring compounds were greater than 0.05. The %RSDs were found to be <30%, except for the following:

Calibration Date: 3/31/03

Compound	%RSD
Benzaldehyde	38.9

Associated samples: Field Blank, 87-7I, 97-231-110, and 97-231-140.

The associated compound results were qualified as estimated (J) if detected.

IV. Continuing Calibration

Volatiles: One continuing calibration was analyzed with this sample set. The compounds had RRFs greater than 0.050 and percent difference (%D) values were <25% except for the following:

Calibration Date: 4/1/03

Compound	% D
2-Hexanone	32.4

Associated samples: All samples.

The associated compound results were qualified as estimated (J), if detected and estimated (UJ), if not detected.

Semi-volatiles: No continuing calibration was run with this sample set

V. Blanks

Volatiles: A method blank and a field blank were analyzed with this sample set. Target compounds were not detected in any of the blanks.

Semi-volatiles: A method blank and a field blank were analyzed with this sample set. Target compounds were not detected in any of the blanks.

VI. System Monitoring Compounds (Surrogate Spikes)

Volatiles: All surrogate spike recoveries were within QC limits.

Semi-volatiles: All surrogate spike recoveries were within QC limits.

VII. Matrix Spike/Blank Spike (MS/BS)

Volatiles: The %R values were within QC limits for the MS/BS.

Semi-volatiles: The %R values were within QC limits for the MS/BS.

VIII. Regional QA/QC (Field Duplicates)

Volatiles: Not applicable.

Semi-volatiles: Not applicable.

IX. Internal Standards Performance

Volatiles: All internal standard area counts and retention times met QC requirements.

Semi-volatiles: All internal standard area counts and retention times met QC requirements.

X. Reported Detection Limits and Compound Identification

Volatiles: The reporting limits were acceptable and the compounds were reported correctly.

Semi-volatiles: The reporting limits were acceptable and no compounds were detected.

XI. Overall Assessment of Data for the Case

Volatiles: The QC presented in the data validation package is acceptable, with the qualifications specified above

Semi-volatiles: The QC presented in the data validation package is acceptable, with the qualifications specified above

Job Number H177

Two samples (92-15, 87-9I-170 for SVOC+1.4-dioxane analysis) were collected on March 27, 2003 and the data was provided in a level 4 package.

I. Holding Times

Semi-volatiles: Samples were extracted and analyzed within holding time requirements.

II. Gas Chromatograph/Mass Spectrometer Instrument Performance Check

Semi-volatiles: All tuning criteria were met.

III. Initial Calibration

Semi-volatiles: One initial calibration was performed with this sample set. All RRF's for target compounds and system monitoring compounds were greater than 0.05. The %RSDs were found to be <30%, except for the following:

Calibration Date: 3/31/03

Compound	%RSD
Benzaldehyde	38.9

Associated samples: All samples.

The associated compound results were qualified as estimated (J) if detected.

IV. Continuing Calibration

Semi-volatiles: No continuing calibration was run with this sample set

V. Blanks

Semi-volatiles: A method blank was analyzed with this sample set. Target compounds were not detected in the blank.

VI. System Monitoring Compounds (Surrogate Spikes)

Semi-volatiles: All surrogate spike recoveries were within QC limits.

VII. Matrix Spike/Blank Spike (MS/BS)

Semi-volatiles: The %R values were within QC limits for the MS/BS.

VIII. Regional QA/QC (Field Duplicates)

Semi-volatiles: Not applicable.

IX. Internal Standards Performance

Semi-volatiles: All internal standard area counts and retention times met QC requirements.

X. Reported Detection Limits and Compound Identification

Semi-volatiles: The reporting limits were acceptable and the compounds were reported correctly.

XI. Overall Assessment of Data for the Case

Semi-volatiles: The QC presented in the data validation package is acceptable, with the qualifications specified above

Job Number H242

Two samples (87-11I, 87-8I for SVOC+1.4-dioxane analysis) were collected on March 27, and 28, 2003 and the data was provided in a level 4 package.

I. Holding Times

Semi-volatiles: Samples were extracted and analyzed within holding time requirements.

II. Gas Chromatograph/Mass Spectrometer Instrument Performance Check

Semi-volatiles: All tuning criteria were met.

III. Initial Calibration

Semi-volatiles: One initial calibration was performed with this sample set. All RRF's for target compounds and system monitoring compounds were greater than 0.05. The %RSDs were found to be <30%, except for the following:

Calibration Date: 3/31/03

Compound	%RSD
Hexachlorocyclopentadiene	32
Benzaldehyde	61.3

Associated samples: All samples.

The associated compound results were qualified as estimated (J) if detected.

IV. Continuing Calibration

Semi-volatiles: One continuing calibration was run with this sample set. The continuing calibration had RRF's greater than 0.050 and %D were < 25% except for the following:

Calibration Date: 4/1/03

Compound	% D
Benzaldehyde	25.6

Associated samples: All samples.

Benzaldehyde results were qualified as estimated (J), if detected and estimated (UJ), if not detected.

V. Blanks

Semi-volatiles: One method blank was analyzed with this sample set. Bis(2-ethylhexyl)phthalate was detected in the method blank. No qualification of the data was necessary.

VI. System Monitoring Compounds (Surrogate Spikes)

Semi-volatiles: All surrogate spike recoveries were within QC limits.

VII. Matrix Spike/Blank Spike (MS/BS)

Semi-volatiles: The %R values were within QC limits for the MS/BS, except for pyrene in the MS. Qualification of the data based on the MS/BS results was not necessary.

VIII. Regional QA/QC (Field Duplicates)

Semi-volatiles: Not applicable.

IX. Internal Standards Performance

Semi-volatiles: All internal standard area counts and retention times met QC requirements.

X. Reported Detection Limits and Compound Identification

Semi-volatiles: The reporting limits were acceptable and no compounds were detected.

XI. Overall Assessment of Data for the Case

Semi-volatiles: The QC presented in the data validation package is acceptable, with the qualifications specified above

Job Number H243

Eight samples (86-5D, 86-1, 86-2, 87-11S, 87-10D, 92-17-275, 92-17-163, for VOC and SVOC+1,4-dioxane analysis and 87-10I for SVOC+1,4-dioxane analysis), one replicate (86-55D), one field blank, and one trip blank were collected on March 28, 2003 and the data was provided in a level 4 package.

I. Holding Times

Volatiles: Samples were analyzed within holding time requirements.

Semi-volatiles: Samples were extracted and analyzed within holding time requirements. The laboratory chronicle for SVOC had the Rinsate Blank preparation data as 4/5/03 (which is out of hold) and the analysis date as 4/7/03. The data for the Rinsate Blank was reviewed and revealed that the sample was prepared on 3/31/03 and analyzed on 4/3/03. The laboratory chronicle was changed to show the proper preparation and analysis date of 3/31/03 and 4/3/03, respectively.

II. Gas Chromatograph/Mass Spectrometer Instrument Performance Check

Volatiles: All tuning criteria were met.

Semi-volatiles: All tuning criteria were met.

III. Initial Calibration

Volatiles: One initial calibration was performed with this sample set. The %RSDs were found to be <30% and RRFs were greater than 0.050 except for the following:

Calibration Date: 2/24/03

Compound	%RSD
Acetone	36

Associated samples: All samples.

The associated compound results were qualified as estimated (J) if detected.

Semi-volatiles: One initial calibration was performed with this sample set. All RRF's for target compounds and system monitoring compounds were greater than 0.05. The %RSDs were found to be <30%, except for the following:

Calibration Date: 4/2/03

Compound	%RSD
Benzaldehyde	49.8

Associated samples: All samples.

The associated compound results were qualified as estimated (J) if detected.

IV. Continuing Calibration

Volatiles: One continuing calibration was analyzed with this sample set on 4/4/03. The compounds had RRFs greater than 0.050 and percent difference (%D) values were <25%.

Semi-volatiles: One continuing calibration was analyzed with this sample set on 4/3/03. The compounds had RRFs greater than 0.050 and percent difference (%D) values were <25%.

V. Blanks

Volatiles: A method blank, a trip blank, and a field blank were analyzed with this sample set. Target compounds were not detected in any of the blanks.

Semi-volatiles: One method blank was analyzed with this sample set. Bis(2-ethylhexyl)phthalate was detected in the method blank. No qualification of the data was necessary.

A field blank were analyzed with this sample set. Target compounds were not detected in the field blank.

VI. System Monitoring Compounds (Surrogate Spikes)

Volatiles: All surrogate spike recoveries were within QC limits.

Semi-volatiles: All surrogate spike recoveries were within QC limits.

VII. Matrix Spike/Blank Spike (MS/BS)

Volatiles: The %R values were within QC limits for the MS/BS.

Semi-volatiles: The %R values were within QC limits for the MS/BS.

VIII. Regional QA/QC (Field Duplicates)

Volatiles: Sample 86-5D was replicated and labeled 86-55D. The replicate results were acceptable.

Semi-volatiles: Sample 86-5D was replicated and labeled 86-55D. The replicate results were acceptable.

IX. Internal Standards Performance

Volatiles: All internal standard area counts and retention times met QC requirements.

Semi-volatiles: All internal standard area counts and retention times met QC requirements.

X. Reported Detection Limits and Compound Identification

Volatiles: The reporting limits were acceptable and the compounds were reported correctly.

Semi-volatiles: The reporting limits were acceptable and no compounds were detected.

XI. Overall Assessment of Data for the Case

Volatiles: The QC presented in the data validation package is acceptable, with the qualifications specified above

Semi-volatiles: The QC presented in the data validation package is acceptable, with the qualifications specified above

Job Number H245

Seven samples (87-12D, 97-23D, 92-4D-180, 92-4D-277, Bachkai, Stull, 87-41 for VOC and SVOC+1,4-dioxane analysis), one replicate (92-44D), and one trip blank were collected on March 27, 2003 and the data was provided in a level 4 package.

I. Holding Times

Volatiles: *Samples were analyzed within holding time requirements.*

Semi-volatiles: Samples were extracted and analyzed within holding time requirements.

II. Gas Chromatograph/Mass Spectrometer Instrument Performance Check

Volatiles: All tuning criteria were met.

Semi-volatiles: All tuning criteria were met.

III. Initial Calibration

Volatiles: One initial calibration was performed with this sample set. The %RSDs were found to be <30% and RRFs were greater than 0.050 except for the following:

Calibration Date: 2/24/03

Compound	%RSD
Acetone	36

Associated samples: All samples.

The associated compound results were qualified as estimated (J) if detected.

Semi-volatiles: One initial calibration was performed with this sample set. All RRF's for target compounds and system monitoring compounds were greater than 0.05. The %RSDs were found to be <30%, except for the following:

Calibration Date: 4/2/03

Compound	%RSD
Benzaldehyde	49.8

Associated samples: All samples.

The associated compound results were qualified as estimated (J) if detected.

IV. Continuing Calibration

Volatiles: Two continuing calibrations were analyzed with this sample set on 4/4/03 and 4/5/03. The compounds had RRFs greater than 0.050 and percent difference (%D) values were <25%.

Semi-volatiles: One continuing calibration was analyzed with this sample set on 4/3/03. The compounds had RRFs greater than 0.050 and percent difference (%D) values were <25%.

V. Blanks

Volatiles: A method blank and a trip blank were analyzed with this sample set. Target compounds were not detected in any of the blanks.

Semi-volatiles: One method blank was analyzed with this sample set. Bis(2-ethylhexyl)phthalate was detected in the method blank. Bis(2-ethylhexyl)phthalate was qualified as non-detect (U) in 92-4D-277.

VI. System Monitoring Compounds (Surrogate Spikes)

Volatiles: All surrogate spike recoveries were within QC limits.

Semi-volatiles: All surrogate spike recoveries were within QC limits.

VII. Matrix Spike/Blank Spike (MS/BS)

Volatiles: The %R values were within QC limits for the MS/BS.

Semi-volatiles: The %R values were within QC limits for the MS/BS.

VIII. Regional QA/QC (Field Duplicates)

Volatiles: Sample 92-4D-180 was replicated and labeled 92-44D. The replicate results were acceptable.

Semi-volatiles: Sample 92-4D-180 was replicated and labeled 92-44D. 1,4-Dioxane was qualified as estimated (J) in 92-4D-180 and 92-44D.

IX. Internal Standards Performance

Volatiles: All internal standard area counts and retention times met QC requirements.

Semi-volatiles: All internal standard area counts and retention times met QC requirements.

X. Reported Detection Limits and Compound Identification

Volatiles: The reporting limits were acceptable and the compounds were reported correctly.

Semi-volatiles: The reporting limits were acceptable and the compounds were reported correctly.

XI. Overall Assessment of Data for the Case

Volatiles: The QC presented in the data validation package is acceptable, with the qualifications specified above

Semi-volatiles: The QC presented in the data validation package is acceptable, with the qualifications specified above

Job Number H272

Two samples (86-3S and 86-3D for VOC and SVOC+1,4-dioxane analysis) and one trip blank were collected on March 29, 2003 and the data was provided in a level 4 package.

I. Holding Times

Volatiles: Samples were analyzed within holding time requirements.

Semi-volatiles: Samples were extracted and analyzed within holding time requirements.

II. Gas Chromatograph/Mass Spectrometer Instrument Performance Check

Volatiles: All tuning criteria were met.

Semi-volatiles: All tuning criteria were met.

III. Initial Calibration

Volatiles: One initial calibration was performed with this sample set. The %RSDs were found to be <30% and RRFs were greater than 0.050 except for the following:

Calibration Date: 2/24/03

Compound	%RSD
Acetone	36

Associated samples: All samples.

The associated compound results were qualified as estimated (J) if detected.

Semi-volatiles: One initial calibration was performed with this sample set. All RRF's for target compounds and system monitoring compounds were greater than 0.05. The %RSDs were found to be <30%, except for the following:

Calibration Date: 4/7/03

Compound	%RSD
Benzaldehyde	42.6

Associated samples: All samples.

The associated compound results were qualified as estimated (J) if detected.

IV. Continuing Calibration

Volatiles: Two continuing calibrations were analyzed with this sample set on 4/7/03 and 4/9/03. The compounds had RRFs greater than 0.050 and percent difference (%D) values were <25% except for the following:

Calibration Date: 4/7/03

Compound	% D
Chloroethane	26.8

Associated samples: 86-3S and TRIP BLANK.

Calibration Date: 4/9/03

Compound	% D
Bromomethane	33.6
Chloroethane	33.6
Acetone	36.8
Carbon disulfide	29.7
2-Butanone	29.4
4-Methyl-2-pentanone	26.8
2-Hexanone	33.1
FreonTF	25.5
1,2-Dibromo-3-chloropropane	37.2

Associated sample: 86-3D.

The associated compound results were qualified as estimated (J), if detected and estimated (UJ), if not detected.

Semi-volatiles: No continuing calibration was analyzed with this sample set.

V. Blanks

Volatiles: A method blank and a trip blank were analyzed with this sample set. Target compounds were not detected in any of the blanks.

Semi-volatiles: One method blank was analyzed with this sample set. Bis(2-ethylhexyl)phthalate was detected in the method blank. Bis(2-ethylhexyl)phthalate was qualified as non-detect (U) in 86-3S.

VI. System Monitoring Compounds (Surrogate Spikes)

Volatiles: All surrogate spike recoveries were within QC limits.

Semi-volatiles: All surrogate spike recoveries were within QC limits.

VII. Matrix Spike/Blank Spike (MS/BS)

Volatiles: The %R values were within QC limits for the MS/BS, except for trichloroethene in the MS. Qualification of the data based on the MS/BS results was not necessary.

Semi-volatiles: The %R values were within QC limits for the MS/BS.

VIII. Regional QA/QC (Field Duplicates)

Volatiles: Not applicable.

Semi-volatiles: Not applicable.

IX. Internal Standards Performance

Volatiles: All internal standard area counts and retention times met QC requirements.

Semi-volatiles: All internal standard area counts and retention times met QC requirements.

X. Reported Detection Limits and Compound Identification

Volatiles: The reporting limits were acceptable and the compounds were reported correctly.

Semi-volatiles: The reporting limits were acceptable and the compounds were reported correctly.

XI. Overall Assessment of Data for the Case

Volatiles: The QC presented in the data validation package is acceptable, with the qualifications specified above

Semi-volatiles: The QC presented in the data validation package is acceptable, with the qualifications specified above

INORGANIC DATA

Job Number C3C070207

One sample (WELL#3), one replicate (WELL#3DUP), and one field blank (FB), were collected on March 6, 2003 and the data was provided in a level 2 package. No raw data was reviewed as part of the inorganic validation for C3C070207.

I. Holding Times

Classical Chemistry: The samples were analyzed within holding time requirements.

II. Blanks

Classical Chemistry: Compounds were not detected in any of the method or field blanks.

III. Laboratory Control Sample (LCS)

Classical Chemistry: The LCS results were within the control limits.

IV. Field Duplicates

Classical Chemistry: Sample WELL#3 was replicated and labeled WELL#3 DUP. The replicate results were acceptable.

V. Overall Assessment of Data for the Case

Classical Chemistry : The QC presented in the data validation package is acceptable, no qualification of the data was necessary.

Job Number G304

One sample (WELL#3), one replicate (WELL#3DUP), and one field blank (FB), were collected on March 6, 2003 and the data was provided in a level 2 package. No raw data was reviewed as part of the inorganic validation for G304.

I. Holding Times

Metals : The samples were analyzed within holding time requirements.

Classical Chemistry: The samples were analyzed within holding time requirements.

II. Calibration

Metals: The initial and continuing calibration requirements were met.

Classical Chemistry : Not provided.

III. Blanks

Metals: One initial calibration blank (ICB), several continuing calibration blanks (CCBs), and one preparation blank (PB) were analyzed with this sample set. Several metals were detected in the ICB, CCBs, and PB. No qualification of the data was necessary.

A field blank was collected and potassium and zinc were detected. Zinc was qualified as non-detect (U) in WELL#3 and WELL#3DUP.

Classical Chemistry: Compounds were not detected in any of the method blanks. A field blank was collected and TDS and DOC were detected. No qualification of the data is necessary.

IV. ICP Interference Check Sample (ICS)

Metals : The percent recoveries (%R) for the ICS analyses were within the control limits.

Classical Chemistry: Not required.

V. Laboratory Control Sample (LCS)

Metals: The LCS results were within the control limits.

Classical Chemistry: The LCS results were within the control limits.

VI. Duplicate Sample Analysis

Metals: The relative percent difference (RPD) values were within the control limits.

Classical Chemistry: The RPD values were within the control limits.

VII. Spike Sample Analysis

Metals: The percent recovery values were within control limits.

Classical Chemistry: The percent recovery values were within control limits.

VIII. Field Duplicates

Metals: Sample WELL#3 was replicated and labeled WELL#3DUP. The replicate results were acceptable.

Classical Chemistry: Sample WELL#3 was replicated and labeled WELL#3DUP. The replicate results were acceptable.

IX. Overall Assessment of Data for the Case

Metals : The QC presented in the data validation package is acceptable with the qualifications listed above.

Classical Chemistry : The QC presented in the data validation package is acceptable, no qualification of the data was necessary.

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